

5. Remove the voltage regulator/rectifier, electrical connector and wires.
6. Install by reversing these removal steps. Make sure all electrical connectors are tight.

### Testing

To test the voltage regulator/rectifier, disconnect the electrical connector from the wiring harness (Figure 34).

#### *NOTE*

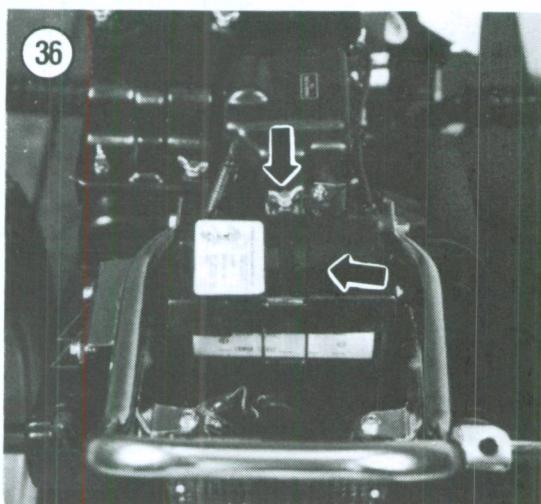
*Tests must be made with a quality ohmmeter or the test readings may be false.*

Make the test measurements using a quality ohmmeter. Refer to Table 1 for ohmmeter positive (+) and negative (-) test lead placement and specified resistance values.

If the voltage regulator/rectifier unit fails *any one* of the tests, the unit is faulty and must be replaced.

### Voltage Regulator Performance Test

1. Remove the seat/rear fender assembly.
2. Remove the wing nuts securing the battery cover (Figure 36) and remove the battery cover.
3. Leave the battery cables attached and connect a DC voltmeter to the battery as shown in Figure 37.
4. Start the engine and let it idle.
5. Increase engine speed until the voltage going to the battery reaches 14.0-15.0 volts.
6. At this point, the voltage regulator/rectifier should prevent any further increase in voltage. If this does not happen and the voltage increases above specification, the voltage regulator/rectifier is faulty and must be replaced.

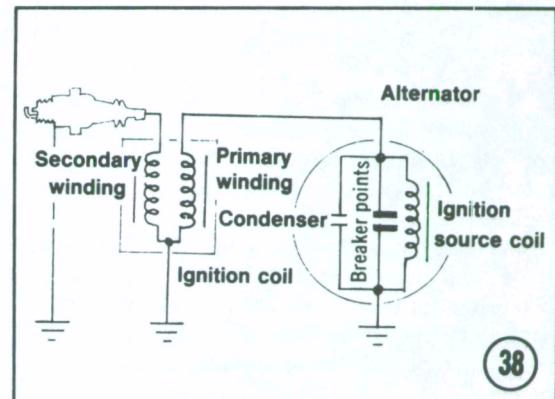
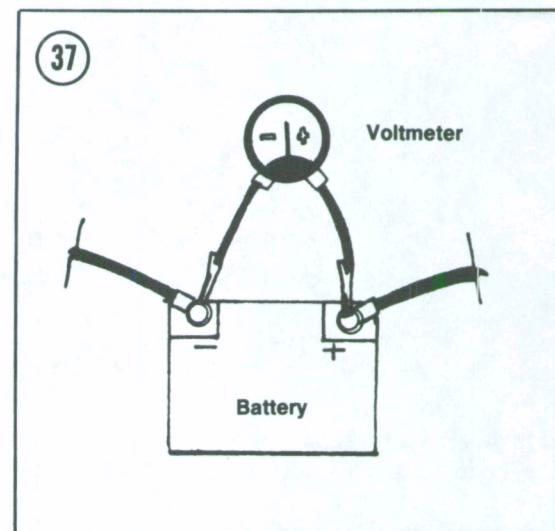


### CONTACT BREAKER POINT IGNITION

Contact breaker point ignition is used on all models except the 1981-on ATC110 and the ATC125M. These are equipped with an electronic ignition system that is covered separately in this chapter.

As the rotor of the alternator turns, magnets located in it move past a stationary ignition source coil on the stator, inducing a current in the coil. A contact breaker assembly that is actuated by a cam (attached either to the crankshaft or camshaft), opens at the precise instant the piston reaches its firing position. The energy produced in the source coil is then discharged to the primary side of the ignition coil where the voltage is stepped up on the secondary circuit to a value sufficient to fire the spark plug.

Figure 38 shows a typical contact breaker point ignition system. For a specific model, refer to the electrical diagrams at the end of this book.



## Breaker Point Inspection and Cleaning

### NOTE

The contact breaker point assembly is mounted on the left-hand side of the crankshaft on all 70 cc engines. On 90-110 cc engines, the assembly is mounted on the left-hand side of the camshaft in the cylinder head.

During normal operation, the contact surfaces of the points gradually pit and burn. If the points are not too badly pitted, they can be dressed with a few strokes of a clean point file or Flexstone (available at most auto supply stores). Do not use emery cloth or sandpaper, as particles will remain on the points

and cause arcing and burning. If a few strokes of the file do not smooth the points completely, replace them with a new set. If the points are still serviceable after filing, remove all residue with electrical contact cleaner or lacquer thinner. Close the points on a piece of white paper such as a business card. Continue to pull the card through the closed points until no particles or discoloration are transferred to the card. Finally, rotate the engine and observe the points as they open and close. If they do not meet squarely (Figure 39) replace them as described in this chapter.

Oil or dirt may get on the points, creating electrical resistance in them or resulting in their failure. These conditions can be caused by a defective crankshaft or camshaft seal (depending on model), incorrect breaker cam lubricant or (on ATC70 engines) dirt getting into the alternator when the crankcase cover is removed. To correct these conditions, remove the contact breaker assembly and dress the points, clean the assembly in lacquer thinner and lubricate the breaker cam with contact breaker lubricant. Never use oil or common grease; they break down under high temperature and frictional load and are likely to find their way to the point surface.

A weak return spring will allow the points to bounce at high engine speeds and cause misfiring. Usually the spring will last for the life of the contact breaker assembly.

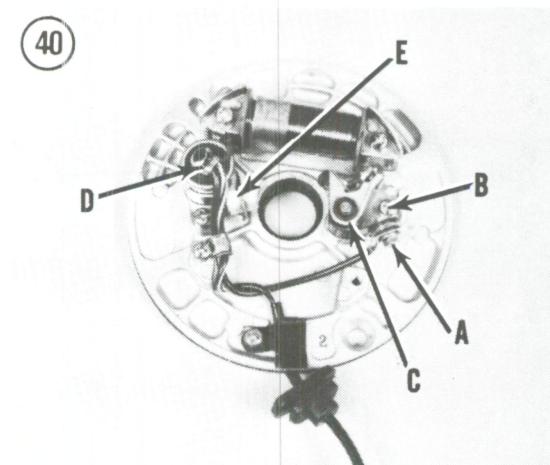
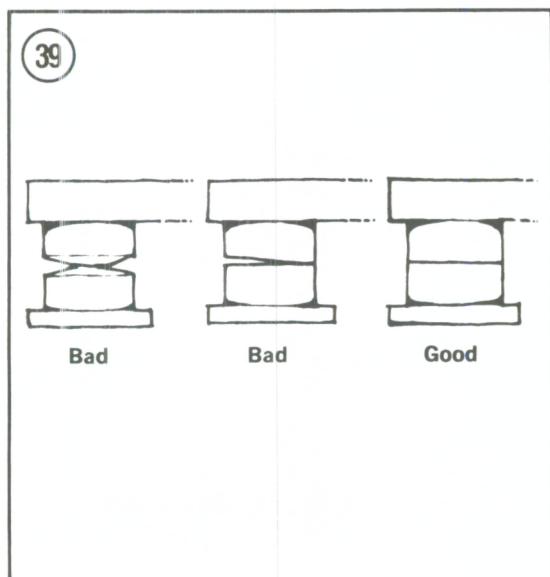
### Point Set Removal/Installation (ATC70)

1. Remove the alternator rotor as described in this chapter.
2. Loosen the nut (A, Figure 40) securing the electrical wire to the contact breaker point assembly and slide the electrical wire out of the assembly.

### NOTE

**Figure 40** is shown with the contact breaker point assembly and alternator stator assembly removed for clarity. It is not necessary to remove the assembly for this procedure.

3. Remove the screw (B, Figure 40) and E-clip (C, Figure 40) which hold the contact breaker assembly in place and remove the breaker point assembly.
4. Install by reversing these removal steps, noting the following.
5. If the contact breaker points were removed from the base plate for cleaning, make sure that the



bakelite washers are reinstalled on the mounting post of the contact breaker point assembly (Figure 41). These washers insulate the condenser and alternator electrical wires from ground. If the washers are not installed, there will be a dead short in the ignition circuit.

6. When the contact breaker point assembly is replaced the condenser (D, Figure 40) should also be replaced. Apply breaker point lubricant to the contact breaker point wick (E, Figure 40) and coat the breaker cam.

7. Adjust the timing as described in Chapter Three.

#### Point Set Removal/Installation (ATC90 and ATC110)

1. Remove the screws (Figure 42) securing the contact breaker point cover and remove the cover and the gasket.
2. Loosen the nut (A, Figure 43) securing the electrical wires to the contact breaker point assembly and slide the wire out of the assembly.

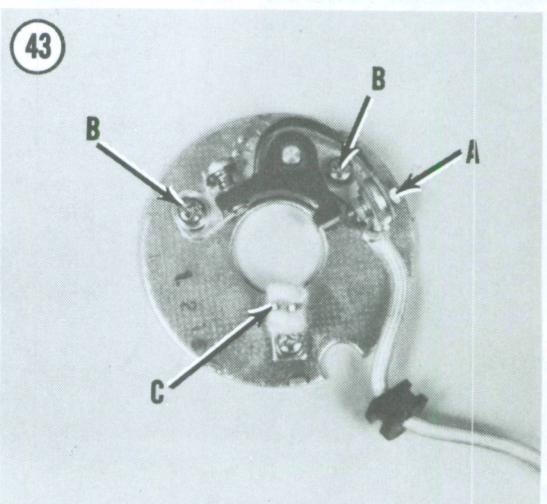
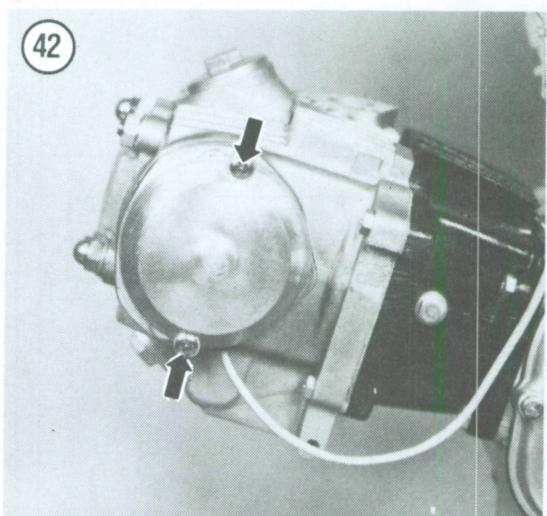
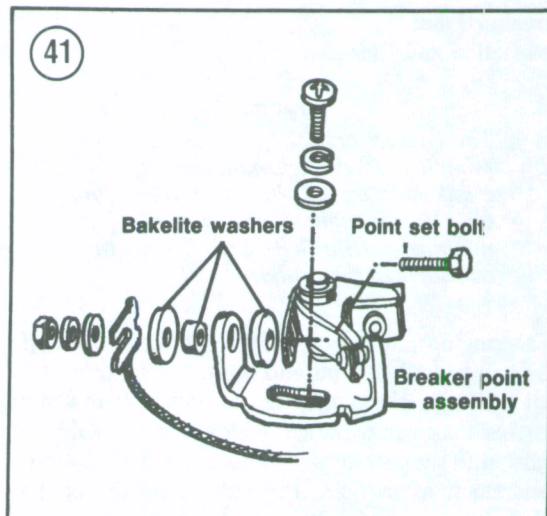
##### *NOTE*

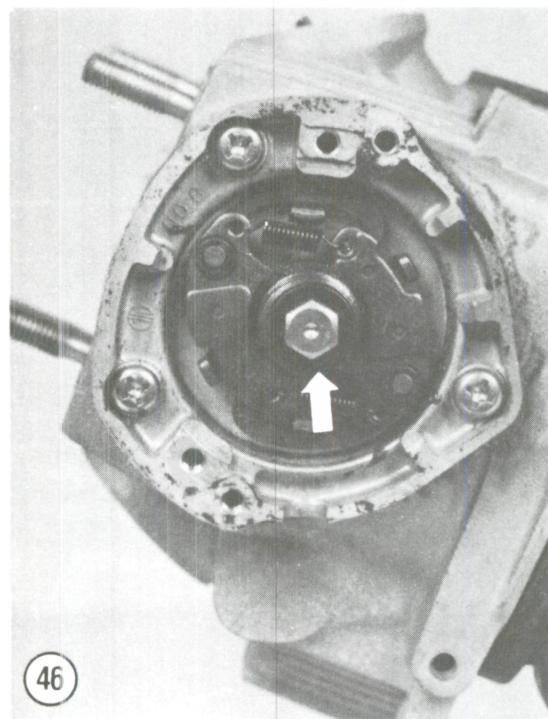
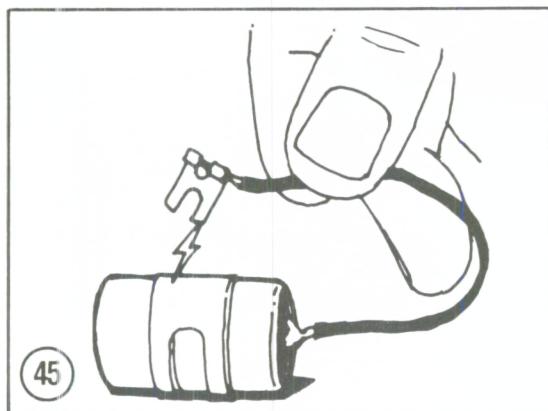
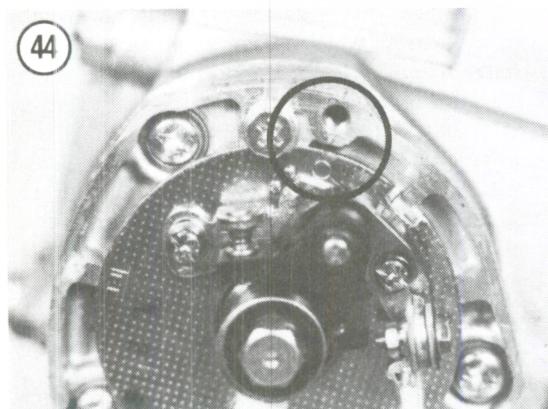
*Figure 43 is shown with the contact breaker point assembly removed for clarity. It is not necessary to remove the assembly for this procedure.*

3. Remove the screws (B, Figure 43) which hold the contact breaker assembly in place and remove the breaker point assembly.
4. Install by reversing these removal steps, noting the following.
5. If the contact breaker point assembly and the base plate were replaced, align the circle on the base plate with the index mark on the base casting (Figure 44). Install the screws.
6. If the contact breaker points were removed from the base plate for cleaning, make sure that the bakelite washers are reinstalled on the mounting post of the contact breaker points (Figure 41). These washers insulate the condenser and alternator electrical wires from ground. If the washers are not installed, there will be a dead short in the ignition circuit.
7. When the contact breaker point assembly is replaced the condenser should also be replaced. Apply breaker point lubricant to the contact breaker point wick (C, Figure 43) and coat the breaker cam.

##### *NOTE*

*The condenser is located next to the ignition coil.*





8. Adjust the timing as described in Chapter Three.

#### Condenser (All Models)

The condenser requires no service other than checking to see that its connections are clean and tight. It should be routinely replaced each time the contact breaker assembly is replaced as described in this chapter.

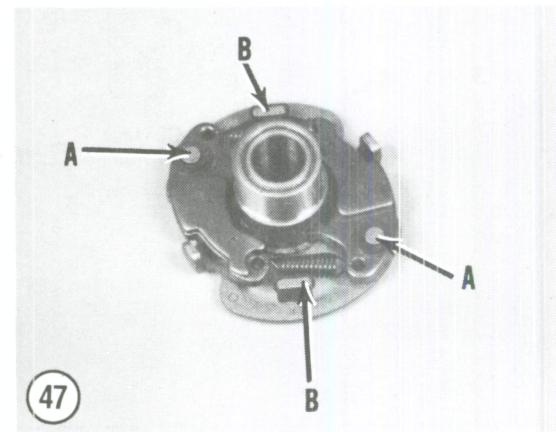
To test the condenser, remove it from the breaker point (or ignition coil) assembly and connect it to a 6-volt battery. Connect the battery negative lead (-) to the condenser lead and the battery positive lead (+) to the condenser case. Allow it to charge for a few seconds. Then, quickly disconnect it and touch the lead to the condenser case (Figure 45). If there is a spark as the lead touches the case, you may assume that the condenser is good. If not, replace the condenser.

#### Ignition Advance Mechanism Removal/Inspection/Installation

The ignition advance mechanism advances the ignition (fires the spark plug sooner) as engine speed increases. If it does not advance properly and smoothly, the ignition will be incorrect at high engine rpm. It must be inspected periodically to make certain it operates smoothly.

The ignition advance mechanism is used on all ATC90 and ATC110 engines. ATC70 engines are not equipped with an ignition advance mechanism.

1. Remove the contact breaker point assembly as described in this chapter.
2. Remove the bolt and washer (Figure 46) securing the ignition advance unit to the camshaft and remove the unit.
3. Inspect the pivot points (A, Figure 47) of each weight. The arms must rotate freely to maintain proper ignition advance.



4. Inspect the return springs (B, Figure 47). Make sure they are taut and they completely return the arms to their fully retarded position.
5. If the unit fails any of these inspections it must be replaced.
6. Install by reversing these removal steps, noting the following.
7. Index the dowel pin on the camshaft (Figure 48) with the notch on the backside of the ignition advance unit. Install the bolt and washer and tighten the bolt to 9-12 N·m (7-9 ft.-lb.).

#### CAPACITOR DISCHARGE IGNITION

The capacitor discharge ignition is used on the 1981-on ATC110 and ATC125M models. The capacitor discharge ignition (CDI) system is a solid-state system that uses no breaker points. Figure 49 shows a typical CDI ignition system.

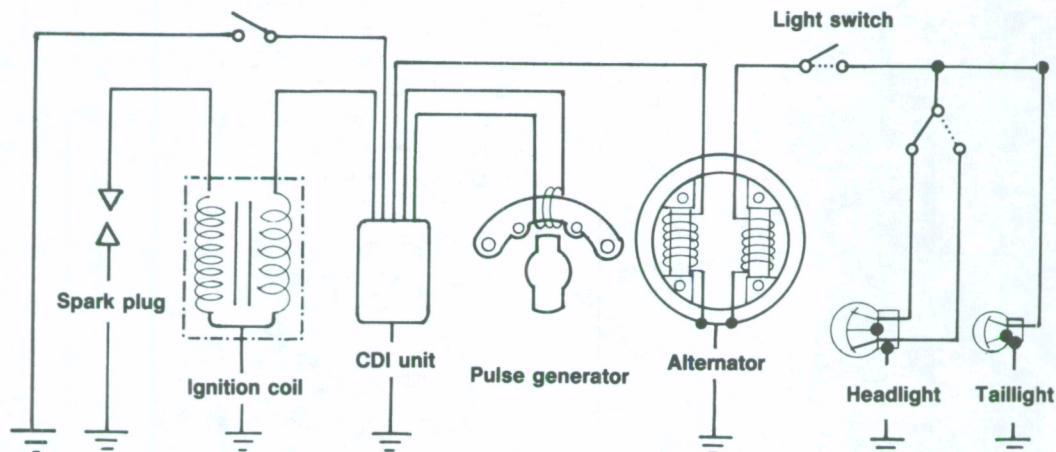
Alternating current from the alternator flows to the CDI unit where it is rectified to direct current and is used to charge the capacitor. At the same time the ignition current is produced, another current pulse is produced by the alternator and a secondary signal coil. This secondary current is timed precisely to coincide with the engine's firing point and can be regarded as the timing signal.

This timing signal is sent to an electronic switch called a thyristor which is connected between the discharge side of the capacitor and the primary side of the ignition coil. In its normal condition, a thyristor blocks the flow of electricity. When the signal reaches the thyristor, it opens, or conducts, permitting the energy stored in the capacitor to discharge to the primary side of the ignition coil where it is stepped up in the secondary circuit to a value sufficient to fire the spark plug.



49

Engine stop switch



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